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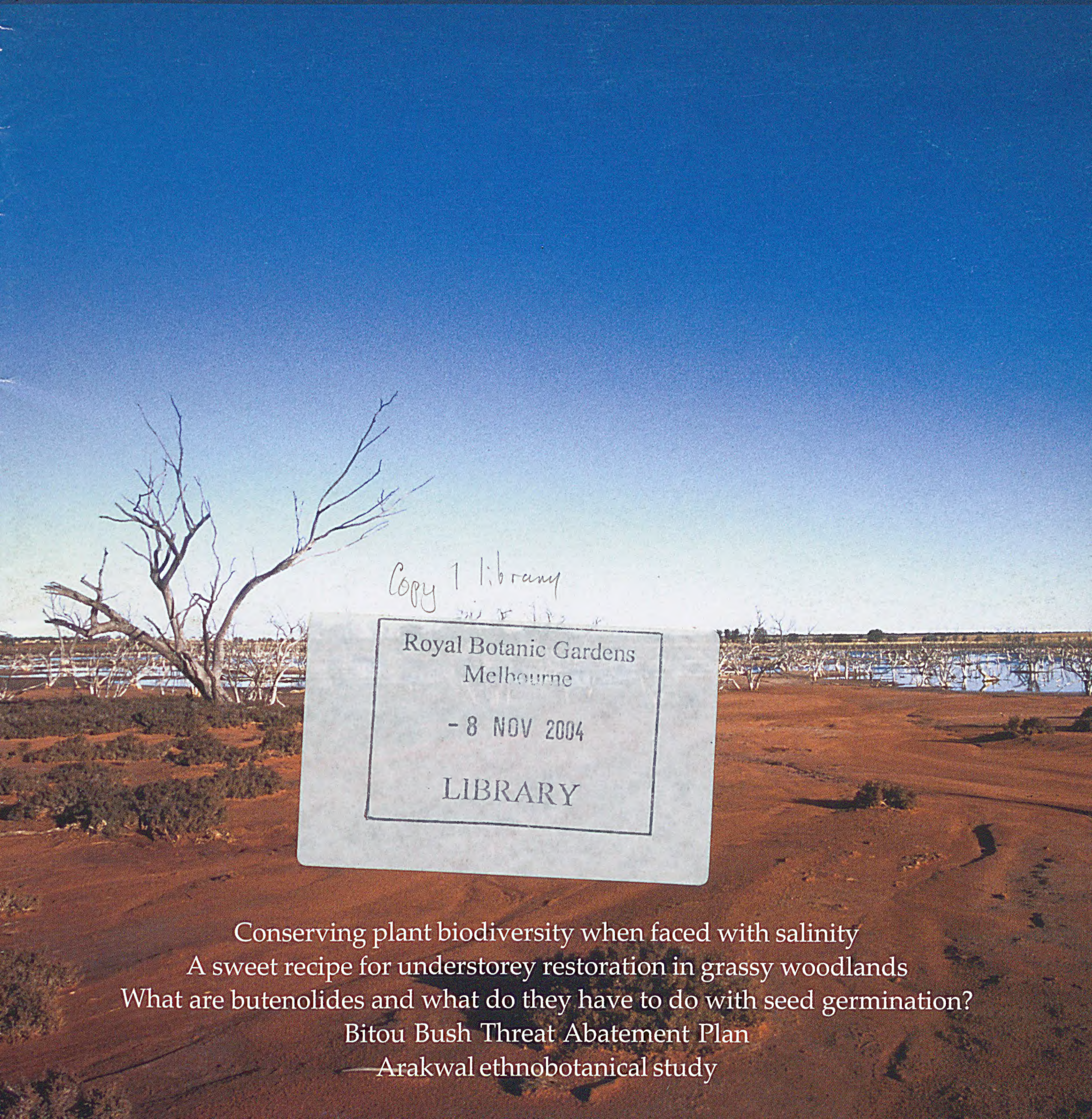

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Conserving plant biodiversity when faced with salinity
A sweet recipe for understorey restoration in grassy woodlands
What are butenolides and what do they have to do with seed germination?
Bitou Bush Threat Abatement Plan
Arakwal ethnobotanical study

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ANPC Inc. Mission Statement

"To promote and develop plant conservation in Australia"

Contributing to *Australasian Plant Conservation*

Australasian Plant Conservation is a forum for information exchange for all those involved in plant conservation: please use it to share your work with others. Articles, information snippets, details of new publications or research, and diary dates are welcome. The deadline for the December-February issue is Friday 3rd December 2004. The December-February issue will be a special edition on 'Conserving plant diversity in wetlands'. Articles not on this theme are still welcome.

Authors are encouraged to submit images with articles or information. Please submit images as clear prints, slides, drawings, or in electronic format. Electronic images need to be at least 300 dpi resolution, submitted in at least the size that they are to be published, in tif, jpg or gif format.

Please send typed or handwritten articles, no more that 2 A4 pages (or 1100 words), by fax, mail, email, or on diskette. If sending by email, please send as a MS Word (2000 compatible) or rich text format attachment to: anpc@deh.gov.au.

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Front cover: Salt scald at Perenjori in the heavily cleared northern wheatbelt of Western Australia. Photo: Andrew Crawford, CALM. **Cover design:** Siobhan Duffy. **Printed by:** Pirion, Canberra.

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President's report

Judy West
Centre for Plant Biodiversity Research
CSIRO Plant Industry

In late September Bendigo hosted the most recent translocation workshop where several of ANPC's dedicated members again presented a variety of material relating to translocation programs. This workshop was attended by 60 participants from a range of organisations including officers from the Victorian Department of Sustainability and Environment, VicRoads, Parks Victoria, Trust for Nature, Melbourne Water and Greening Australia. From the evaluation feedback received it would appear that those participating found the variety of the day very helpful and were impressed with the input and the professional nature of the material. As with previous workshops, attendees judged the 'case study presentations [to be] particularly useful' and were pleasantly surprised with the 'take-home resources'. We are very grateful to our sponsors, the Victorian Department of Sustainability and Environment and North Central Catchment Management Authority, for joining us in hosting this workshop.

Given the high demand for information about translocation processes ANPC will provide opportunity for interested practitioners or anyone wanting to know how or what to do, in both Western Australia and south-east Queensland to attend translocation workshops before the end of the year. The WA workshop will be held in Perth on Tuesday 23 November at the CALM Training Centre, Hayman Rd, Kensington, and for Queensland in Brisbane on 3 December 2004 at the Brisbane Botanic Gardens Auditorium, Mt Coot-tha Road, Toowong. See information in this issue or the website for details.

ANPC is also running two rehabilitation workshops in November/December in south-east Queensland with support provided by Qld Envirofund and the Queensland Herbarium. These workshops will have a strong focus on techniques for assessing a remnant vegetation site (condition, ecosystem function, threats, biodiversity values), assessing the task ahead and planning the rehabilitation project, building in practical and informative monitoring from the earliest planning stages, and monitoring and adaptive management into the future. The programs have been specifically tailored for the region, incorporating local case studies and drawing on practical experience and scientific investigation.

This issue of APC includes a number of articles relating to various aspects of conservation of our plant biodiversity, from information on threatening processes to practical tips on revegetation programs. I have just returned from the Philippines and Taiwan where I attended a conference and participated in a systematics capacity building symposium. Those of you who have visited these countries will be aware there is much to consider when formulating programs and policies for conservation of precious biodiversity. At a time when Australia is addressing issues such as land clearing, salinity, invasive species, land degradation and changes in landscape structure as major influences shaping the future of our environment, we should be mindful of the increased complications in small countries like Taiwan with a human population almost the same as that of Australia. The contrasts made me feel we have an impelling responsibility to do more to promote and implement much of the scientific research that is providing some hopeful solutions.

As an executive group managing and leading this association, the ANPC National Committee makes judgements about the directions and activities to pursue. Our current formula concentrating on linking scientific outputs with on-ground landscape management through training workshops is producing some very positive outcomes for ANPC, and builds on a vast investment we have made in the past. It would be helpful to hear from members if you have ideas or suggestions of directions that the ANPC might take. Or you may wish to suggest a topic for a special issue of APC along the lines of the last one dealing with urban plant conservation. Please feel free to email or call the office with your thoughts.

The next issue of APC will be a SPECIAL EDITION ON:

CONSERVING PLANT DIVERSITY IN WETLANDS

Articles and short notes on wetland conservation projects or research are invited.
We are particularly interested in the frequently forgotten small wetlands and swamps.

See title page section on 'Contributing to Australasian Plant Conservation' for additional information.

Correction: In the June-August issue of APC, the author contact details for an article by Karina Mercer and Annie Bond were listed incorrectly. Contact details should have read: Karina Mercer, SA Co-ordinator, Threatened Species Network, c/- Conservation Council of SA, Ph: (08) 8223 5155; and Annie Bond, Project Officer, Threatened Plant Action Group, c/- Nature Conservation Society of SA, Ph: (08) 8232 4088. The ANPC apologises for this error.

Salinity and plant diversity: The role of *ex situ* conservation

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Biodiversity in Australia is under threat from land clearance, changing land use, the introduction of exotic flora, fauna and diseases. Many of the major threats are a direct result of the extensive clearing and associated degradation of vegetation which has occurred over the past 200 years since white settlement. But the greatest environmental threat facing Australia's biodiversity is salinity. Salinity was seen as primarily a problem for agricultural production, water quality and infrastructure (Dillon and Lewis 2001), but there has been a slow realisation that biodiversity in wetlands, rivers and low-lying areas is also being threatened and that rising salt is contributing to species extinctions, destruction of ecological communities and a decline in ecosystem health.

The south-west agricultural zone is one of the most severely salt affected areas in Western Australia. This area is the centre of floral diversity for many of the species-rich plant groups (*Acacia, Dryandra, Eucalyptus, Grevillea* and *Verticordia*) that typify southern Western Australia. The flora is estimated at 3,000 to 4,000 vascular species, with roughly 60% endemism. The distributions of many of these species are naturally restricted by the physical features of the landscape, such as valley floors and wetlands. Plant species found in low-lying areas are at most risk of extinction from salinisation. Other species found only in woodland sites will be under threat in the longer term. Clearing for agricultural practices in this species-rich area has led to the fragmentation of the vegetation and the restriction of many plants to road verges and small remnants. Although much of the native vegetation evolved to be salt-tolerant, some of these species may only survive if the salt remains well below the water table. At the species level, preliminary findings indicate that 450 endemic vascular plants are at risk (Keighery *et al.* 2000). A further 400-500 species may be faced with genetic erosion as salinity decreases their population extent and number (Keighery 2000). In addition to threats to individual species, many plant communities are considered in danger of extinction.

Management of these species and vegetation remnants to maintain their biodiversity is a priority task. 1.8 million hectares in the south-west agricultural region are already affected by salinity to some extent and projections show that without rapid, large-scale intervention, including significant changes to current land use practices, about three million hectares will be affected by 2010-2015 (State Salinity Council 2000). Long-term predictions forecast a 50% loss of the remaining remnant vegetation of the agricultural wheatbelt from salinity (George *et al.* 1995).

Lake Bryde, a freshwater wetland of the southern Wheatbelt of Western Australia, dominated by Tecticornia verrucosa *and the threatened* Muehlenbeckia horrida *subsp.* abdita *across the lake floor. This lake system is being impacted by changed hydrology. Photo: Anne Cochrane (CALM)*

Ex situ conservation (seed banking)

As there is no single solution to the salt problem, national and state governments have recommended a strategic and integrated approach to addressing salinity. Restoration of native vegetation, tree planting, changes in land use practices and engineering works are all tools in this strategic approach. Designating areas as nature reserves, national parks and conservation areas will not safeguard plants from the effects of salinisation; we need different approaches to biodiversity conservation. The use of *ex situ* conservation facilities (seed banks) as "insurance" for species threatened by hydrologic change is an additional measure recently adopted at both national and state levels (Anon 1996; State Salinity Council 2000).

(left to right) Allocasuarina fibrosa *winged seed. This Declared Rare Flora species occurs in the heavily cleared agricultural wheatbelt; Seed of a poorly known and as yet unnamed* Caustis *species (Cyperaceae) from the south-west of Western Australia; Seed of the threatened* Eleocharis keigheryi, *a sedge from low lying areas of the south-west of Western Australia. Photos: Anne Cochrane (CALM)*

Seed banking ensures that even if species are lost in the wild, plants will always be available for future conservation and use. Storing seed allows each species to be widely sampled, thus capturing a broad range of genetic diversity at an economically viable cost. In Western Australia, the Department of Conservation and Land Management (CALM) has established the Threatened Flora Seed Centre as a seed banking facility. This is part of the Western Everlasting Project that underpins plant recovery programs in that state. It is the principal long-term repository for seed of rare and threatened flora from Western Australia. The aim is to store sufficient genetic resources from each threatened species to ensure its successful reintroduction and establishment in the wild, and to obtain comprehensive biological data to enable effective planning, conservation and management of each species. CALM considers collection and long-term storage of these species to be of fundamental importance for conservation. Species at risk of extinction from hydrologic change have been selected. Additional species are targeted based on their association with recovery catchments, or their presence in Threatened Ecological Communities at risk of degradation from salinity. Future collections will target Commonwealth-identified biodiversity hotspots.

Wider conservation benefits

In addition to complementing in situ efforts, ex situ conservation has other benefits. Seed banks help educate the public about plant diversity and conservation. Ex situ conservation provides not only a focus, but also a readily accessible and cost-effective source of material for research and recovery actions. Effective germination and propagation protocols are developed for species in seed banks, contributing knowledge and skills fundamental to the success of in situ conservation and recovery works used in the restoration of native ecosystems. There is currently a range of reintroduction projects linked to CALM's ex situ conservation program, aimed at augmenting populations of critically endangered species affected by salinity.

Critical biological data are gathered through the processes of seed identification, collection, processing and storage, which together with field-based ecological studies are a fundamental element of recovery strategies. Species-specific ecological information is vital for conservation planning and management, helping to set conservation priorities and providing clarification of threatening processes. Research into population genetic structure using *ex situ* conserved material can make important contributions to the conservation and management of rare and threatened species and to the identification of conservation status. Investigations into seed storage behaviour can maximise the application of the material for its sustainable use in research and recovery.

Seed banking activities generate a wider practical understanding of seed biology in native species. This information can be applied to the horticultural industry, helping to increase the range of commercially available perennial native plant species. Significant breakthroughs in developing technologies in seed germination can also reduce the cost of growing commercial plant species (e.g. oil mallee or *Melaleuca* species) important for combating salinity.

There is now an urgent need for native plants to be screened for current and future impacts of salinity in the same way that they are screened for susceptibility to dieback (Shearer *et al.* 2001). Such research can be carried out on *ex situ* material, whilst storing seed successfully secures the future of seed-bearing plants. In this way, investigations into species' response to salt and varying levels of inundation can be made without further affecting wild populations. Such investigations will provide a better basis for evaluating species at risk and for identifying species for restoring areas affected by hydrologic change, and will also provide guidelines for species management.

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A Sweet Recipe for Understorey Restoration in Grassy Woodlands - Add Sugar, Seed and Burn in Spring!

Suzanne Prober, Kevin Thiele and Ian Lunt

The Johnstone Centre, Charles Sturt University, GPO Box 789, Albury, NSW, 2640

Eucalypt woodlands once covered about 13% of Australia, flourishing in the medium rainfall areas between the moist forested coasts and the drier interior of the continent with its shrublands and grasslands. Woodlands are usually characterised by their dominant tree species, but the greatest plant diversity is found beneath and between the trees.

Across much of southern Australia, these once extensive woodland landscapes and their carpets of wildflowers have been replaced by mosaics of crops and pastures dotted with remnant trees. The grassy White Box woodlands, once common in the wheat-sheep belt of NSW, are so threatened with extinction that they are listed as nationally endangered under the *Environment Protection and Biodiversity Conservation Act 1999*. Only in the rarest and tiniest of remnants can the original understorey of these woodlands still be seen.

These scattered and degraded woodlands have attracted serious conservation effort, and many remnants have been protected from stock by fencing. This is especially valuable for encouraging tree and shrub regeneration, but the native grasses and wildflowers of the ground layer don't seem to recover so well. Where seed banks have been lost, some species will never return without assistance. And even then, it seems that many of the annual and perennial weeds that have come to dominate many sites do not disappear once grazing is removed.

One reason for this poor recovery may be that some fundamental conditions (such as soil nutrient levels) in the remnant have changed, so that secondary and introduced species are now favoured over the original natives. If this is the case, such changes may need to be reversed before restoration efforts can be successful.

To determine how soils change when a remnant is degraded, we compared a range of degraded grassy White Box woodland remnants with some of the rare, ungrazed ones in the Central West region of NSW. We sampled their topsoils and compared levels of compaction, pH and a wide range of soil nutrients. The most striking difference between ungrazed and degraded remnants was in levels of soil nitrate, a form of nitrogen that is readily available to plants. Soil nitrate was extremely low in all ungrazed remnants, and increased proportionally with annual weed abundance across all types of degraded remnants in our study.

Restoration trials

From these results we suspected that soil nitrate levels are an important driver of annual weeds in grassy woodlands. So we established some understorey restoration trials, targeting management interventions that might reduce soil nitrate. As well, we tried to reduce weed seed banks and enhance native grass establishment, towards our general goals of promoting native grasses and depleting annual weeds. We set up the trials at two different types of degraded remnants, one dominated by annual weeds with few natives, and the other dominated by a mix of grazing tolerant native grasses, particularly Red Grass (*Bothriochloa macra*), and annual weeds.

Reducing soil nitrate. So first, how could we reduce soil nitrate levels? There is an enormous quantity of information on how to increase soil nitrogen to improve crop growth, but very little on doing the reverse. One way might be to remove nitrogen by removing the standing crop of lush green weeds, by burning, slashing or grazing during spring. We took this approach by burning in mid-October. This did not appear to reduce soil nitrate in the short-term at least (Fig. 1), although it had other positive effects; (see below).

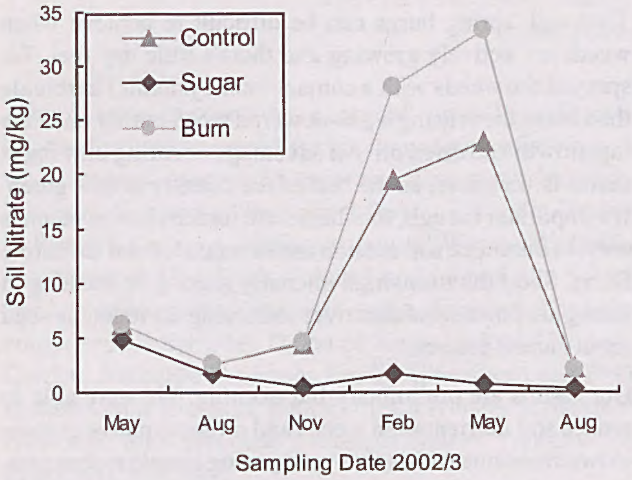

Figure 1. Soil nitrate levels over a 15 month period in a grassy White Box woodland remnant near Young. Half a kilogram of sugar per square metre was added every three months to sugar plots, burn plots were burnt in October 2002 and control plots were untreated.

Another method we tried was to increase the carbon: nitrogen ratio in the soil by adding carbon. Most farmers will be aware that crop stubble can temporarily reduce plant growth because soil microorganisms that break down the stubble use up available soil nitrogen. So we tried the same thing by adding white sugar, a faster acting form of carbon than crop stubble, hoping to reduce growth of nitrogen-loving weeds and thus allow natives to gain an advantage. We found that adding half a kilogram of sugar/m^2 every three months reduced soil nitrate to very low levels (similar to those in ungrazed remnants), and dramatically reduced the growth of all annual weeds (Figs 1 & 2).

Reducing weed seed banks. We also tested the effectiveness of spring burning and carbon addition for reducing weed seed banks. Spring burning effectively removed the entire year's seed crop of cool season annuals, and there was a dramatic reduction in the abundance of annual grass weeds the next spring (Fig. 2). However, broad-leaf weeds like Paterson's Curse did well after the burns, probably because they have longer-lived seed banks than the grasses, or because they establish better in the bare soil left after burning.

The reduction in weed growth resulting from the sugar treatments is also likely to have reduced seed set in annual weeds. However, even very small plants were able to set seed, providing some replenishment of the weed seed bank.

Enhancing native grass establishment. Suppressing weeds by reducing soil nitrate or through spring burning gave us a window of opportunity for establishing native grasses. For this, we added seed of Kangaroo Grass (*Themeda australis*) and Snow Grass (*Poa sieberiana*), the two original native grass dominants of the grassy White Box woodlands. Unfortunately this was during the severe drought of 2002-3, and no Snow Grass plants established. Surprisingly, Kangaroo Grass established successfully over the summer, and some plants survived despite prolonged dry periods in the following autumn and winter.

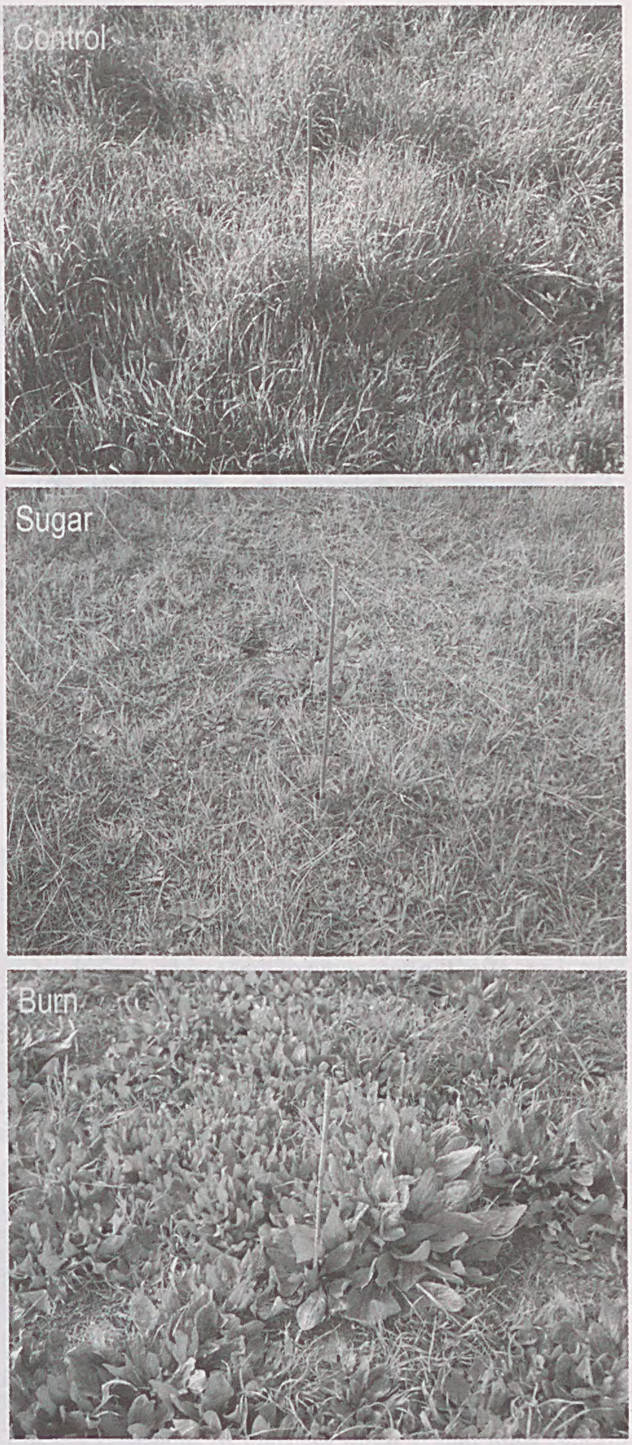

*Figure 2. Early effects of burning and sugar addition on annual weeds in a site initially dominated by Wild Oats (Avena spp), Bromes (*Bromus spp*) and Patersons Curse (*Echium plantagineum*). Photos: Kevin Thiele*

Kangaroo Grass established very sparsely on untreated plots that still had a thick layer of dead annual weeds. Establishment was enhanced by the sugar treatments, and was most successful on burnt plots (Fig. 3).

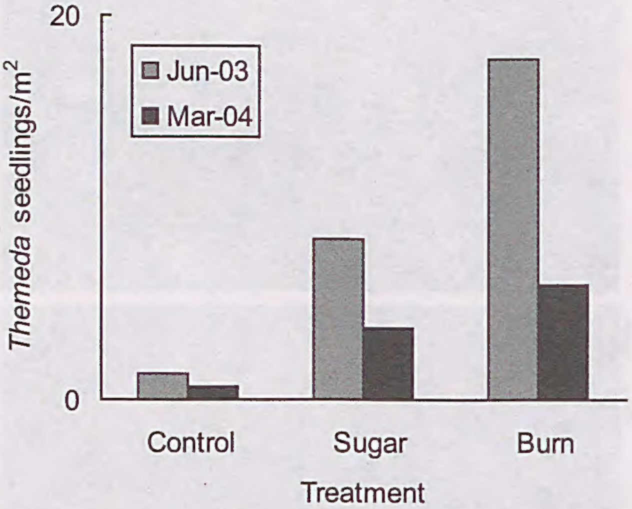

Figure 3. Establishment of Kangaroo Grass on untreated plots was poorer than on burnt plots and plots with sugar added. Loss of seedlings on burnt plots later in the season was due to an extended dry period.

Two years on.......

Two years after the beginning of these trials, the best of our experimental plots are beginning to resemble native grassy swards. The most promising results were obtained when Kangaroo Grass seed was added to plots that were burnt or 'sugared'. Plots without Kangaroo Grass seed were generally poorer in quality, and were very variable, depending on whether any other native plant seeds were already present to replace the weeds.

An exciting result from our most recent measurements has been evidence that in plots with good establishment, Kangaroo Grass plants themselves are helping to reduce soil nitrate levels. This provides an early indication that with effective re-establishment of a dense sward of Kangaroo Grass, the ecosystem may return to a more natural (low nitrate) state that is more resistant to invasion by exotic annuals.

Implications for woodland understorey restoration

Carbohydrate addition and spring burning show promise for restoring many degraded woodland understoreys, and we suspect that a combination of burning plus carbohydrate addition (which we didn't try) may be even more effective. These management techniques are likely to be most effective in remnants where annual grasses are the dominant weeds, as is the case in many grassy woodland remnants in winter-rainfall areas. However, they won't be appropriate for restoring all remnants. A different strategy will be needed where invasive perennial weeds such as Coolatai grass (*Hyparrhenia hirta*) are the main problem. For remnants that retain few native plants in the ground layer, cultivation and sowing of native seed may be a more efficient option if the site is easily ploughed, but carbohydrate addition may still assist establishment of natives by reducing the post-cultivation nutrient pulse and subsequent weed competition.

Thorough spring burns can be difficult to achieve when weeds are actively growing and there's little dry fuel. We sprayed the weeds with a contact (non-systemic) herbicide then burnt them using a gas-powered weed burner once the top growth had dried off. An advantage of spring burning is that it is very safe, as the rest of the country is still green. It's important though, that burns are undertaken in patches only, to minimize soil erosion and to retain habitat for native fauna. Short duration, high intensity grazing or slashing in spring are potential alternatives to burning for reducing seed set in annual grasses.

Our results are preliminary but exciting. We were able to reduce soil nutrients and weeds and promote native grasses in two remnants within two years, using simple techniques. Clearly, further trials are needed to investigate whether this approach is economic across a wide range of sites, to identify cheaper forms of carbohydrate (refined white sugar is probably the most expensive form available!), and to develop practical ways to 'scale-up' the method so it can be used across larger areas. With further R&D, our sweet restoration recipe may provide a simple way to restore many degraded woodlands in the future.

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Australian Discovery Heralds New Understanding of Seed Dormancy

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After 11 years of searching, a team of Australian scientists has finally cracked one of the great mysteries of ecology – what causes so many seeds to sprout after a raging bushfire. The team of scientists from Kings Park and Botanic Garden in Western Australia, The University of Western Australia and Murdoch University, isolated and identified a potent and new molecule that stimulates seed germination. The team comprised Dr Kingsley Dixon of Kings Park and Botanic Garden; Associate Professor Emilio Ghisalberti and PhD student Gavin Flematti, both of the University of Western Australia; and Associate Professor Robert Trengove of Murdoch University.

For centuries, people in Africa have used smoke to improve the germination of crops such as red rice and maize. In the late 1980s, South African scientists found they could promote the germination of wildflower seeds with the help of smoke from burnt wild plants. Since then teams in the US, Germany, South Africa and Australia have been hunting the magic ingredient in smoke that triggers germination. Earlier this year the Western Australian team finally identified the chemical in smoke. Of the thousands of chemicals in smoke from burning plants, just one turns out to be the key to germination – a new compound belonging to a group of chemicals called butenolides.

Many species including wild daisy species germinate in response to the chemical butenolide. Photo: Kingsley Dixon

Cottontails (Conostylis) were an important native species used to discover the chemical in smoke. Photo: Kingsley Dixon

The scientists created an artificial version of bushfire smoke by combusting filter papers, which consist mainly of the common building blocks of all plant tissues, cellulose. They painstakingly separated out each component of the smoke and tested its capacity to trigger germination in a range of seeds. The one that worked was the previously unknown butenolide, which gave similar results to treatment of seeds with whole smoke or smoke water.

The team then synthesised the chemical in pure form and tested it on lettuce seeds, chosen for the speed at which they sprout. The butenolide produced an 80% success rate, double that for untreated seeds. It worked on native wildflowers too, increasing germination of the yellow-flowered *Conostylis aculeata* from around 10% to 50%. A more reluctant germinator, the queen trigger plant (*Stylidium affine*), also responded well, with a forty-fold increase in germination! The discovery holds promise as a more cost-effective tool for recreating native landscapes damaged by mining or other activities. The chemical is so potent that just one third of a teaspoon applied to one hectare (2.2 acres) is all that is required to stimulate germination. Plant-derived smoke already achieves a 48 to 55-fold increase in germination performance in post-mined landscapes.

In further tests, the butenolide triggered the germination of seeds from three continents that have fire-prone floras. A surprising part of the discovery was that the molecule also triggers germination of plants that rarely or never experience fire, including some important agricultural weeds. This opens up the prospect of using the butenolide to make weed seeds sprout, allowing farmers to use a knockdown herbicide prior to sowing a crop, thereby saving money and providing a method with potential for weed-free farming.

The universal nature of butenolide may indicate a possible universal role for the chemical in regulating dormancy of seeds. This possibility is now being tested in collaboration with researchers at the University of Edinburgh. Kew too has joined in the research with a programme to check how extensive the chemical's effects are by testing it on seeds from the collections in the Millennium Seedbank. In Australia a national link-up of seed researchers from botanic gardens, herbaria and universities will test local species for their response to the butenolide. For more information contact your local botanic garden.

The discovery team with the Premier of Western Australia following the world announcement of the discovery (Left to right: Dr Kingsley Dixon, Hon. Geoff Gallop (Premier of WA), Assoc Professor Emilio Ghisalberti and Gavin Flematti (The University of WA). Dr Robert Trengove of the discovery team not in photo. Photo: Fiona Goss

After a summer bushfire the bushland in Australia is painted in floral displays - now known to result from the action of the butenolide released from the smoke. Photo: Kingsley Dixon

Further reading

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The Draft Bitou Bush Threat Abatement Plan: weed control and plant conservation

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Introduced species (e.g. pests and weeds) pose one of the greatest threats to biodiversity. Unfortunately, this cause and effect relationship has not translated into management strategies that address both biodiversity conservation and invasive species management equally, especially at a landscape or a population level. At a localised scale, control techniques like bush regeneration can help control weeds and conserve biodiversity. However, such localised approaches do not offer a strategic way of merging weed control and conservation at a policy level; nor do they reduce the impacts of weeds on biodiversity on a regional or landscape scale. More strategic approaches would allow weed control to be prioritised to areas of high conservation value and help improve our knowledge of the effects of weeds on biodiversity. There are several reasons why such strategies have not been developed:

- invasive species management has not been aligned with available information on the impact of introduced species on biodiversity;
- information on the species directly affected by each introduced species is inadequate;
- some weed species or native plants are listed under several acts/policies, while others are not listed under any, which can greatly influence their management. For example, bitou bush is listed as a Noxious Weed, as a Weed of National Significance and a Key Threatening Process, while other major weeds are not addressed under any such initiatives (see Downey 2003a for more information).
- these two areas of management (i.e. invasive species and biodiversity conservation) have historically been treated as two separate disciplines.

In Australia, legislation has been established to address threats to biodiversity as part of the Australian Government and New South Wales Threatened Species Acts. Through the provision for listing 'Key Threatening Processes' and the subsequent development of 'Threat Abatement Plans', these acts can offer a more strategic approach to reducing the impacts of invasive species on biodiversity. This article presents an overview of this approach to merging invasive species management and biodiversity conservation at a landscape level, using the first threat abatement plan for a weed in Australia as an example.

Key Threatening Processes (KTP)

Under the NSW *Threatened Species Conservation Act 1995* (TSC Act) and the Australian Government *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) anything that threatens biodiversity can be listed as a Key Threatening Process (KTP), provided it meets defined criteria. Here the discussion is limited to the TSC Act only. A KTP must threaten two or more species, populations, or endangered ecological communities listed under Schedules 1 and 2 of the Act, or cause species, populations or ecological communities not listed to become so.

The process for listing a KTP is outlined in the Act. Any person or organisation can submit a KTP nomination that meets the requirement to the NSW Scientific Committee (the independent body that adjudicates on listings). A preliminary determination is then made to either list or reject a nomination. All preliminary determinations made by the Scientific Committee are placed on public exhibition. Submissions received during this period are considered and a final determination is made: if the KTP is accepted it is listed under Schedule 3 of the TSC Act.

In Australia to date, weeds have been under-represented as KTPs compared to pest animals and have only been listed as KTPs under NSW threatened species legislation. The two weed KTP listings are:

1. 'Invasion of native plant communities by bitou bush/ boneseed' (both subspecies of *Chrysanthemoides monilifera*): boneseed is less of a threat than bitou bush in NSW, so here discussion is confined to bitou bush; and
2. 'Invasion of native plant communities by exotic perennial grasses'. This nomination identifies five grass species that pose a significant threat to biodiversity and a further 14 grass species which are capable of threatening biodiversity.

Together, these two KTPs cover 20 weed species. However, the number of weeds which may meet the criteria for listing as KTPs is estimated to be 350 species Australia-wide and 200 species within NSW. Therefore in NSW only 10% of the weeds that could be listed as KTPs have been listed (see Downey and Leys 2004, for further discussion of weeds as KTPs). There are no obvious reasons why the number of weeds listed as KTPs is small.

Of the 200 or so weed species that could be listed as KTPs in NSW, information is currently available to meet the criteria for listing for only a handful of species, e.g. lantana and Scotch broom. While the remaining species pose similar threats to biodiversity, little has been done to determine the exact species at risk, which is a major oversight. This may be because of the separate historical approach to weed management and plant conservation mentioned above.

Once a KTP has been listed, the Act requires a threat abatement plan (TAP) to be prepared.

Bitou bush flowers and fruits. Photo: Paul Downey

Threat Abatement Plan (TAP)

A TAP is a strategic plan to abate, ameliorate or eliminate the threat posed by a KTP to threatened biodiversity (i.e. native species, populations and/or ecological communities), independent of land tenure. TAPs are prepared in accordance with specific criteria established under the TSC Act. The NSW Department of Environment and Conservation (which includes the former National Parks and Wildlife Service) is responsible for preparing TAPs under the TSC Act. Once prepared, a draft TAP must be placed on public exhibition. The public's comments are then incorporated and a final version of the TAP has to be approved by the NSW Minister for the Environment in accordance with the TSC Act.

Bitou Bush Threat Abatement Plan (Bitou TAP)

The KTP listing 'Invasion of native plant communities by bitou bush/boneseed' has led to the development of a draft TAP (the Bitou TAP), the first TAP for any weed in Australia. The Bitou TAP was on public exhibition at the time of writing (until 22/10/04).

The Bitou TAP aims to conserve biodiversity by:

- developing a strategic framework for targeting bitou bush control to areas where the biodiversity benefits will be greatest
- developing and promoting best practice management
- monitoring the effectiveness of control programs in terms of the recovery of threatened biodiversity
- fostering community education, involvement and awareness
- identifying and filling knowledge gaps where possible

Considering the first point, one of the key problems when developing the draft TAP was to identify the species and plant communities at risk from bitou bush invasion. While bitou bush has been widely acknowledged as a serious threat to coastal plant communities in Australia, little was known (documented) of the species at risk. The research involved in developing the Bitou TAP increased the number of plant species known to be at risk from 3 to 63 (Table 1). A further 70 species have been identified as potentially at risk, but we need more information to understand the likely impact. This increase in the number of species at risk is not a reflection of a sudden increase in the impact, but instead the result of better understanding of the actual impact. One constraint when it comes to determining the species at risk is that people often see a weed near a threatened plant and automatically assume it is threatening the plant, without quantifying the actual impact. To avoid such assumptions, consultations with land managers and botanists were undertaken during the development of the Bitou TAP.

Table 1. Plant species at risk from bitou bush invasion (Source: reproduced from Downey 2004).

Sources in chronological order	Number of plant species at risk in NSW
KTP nomination	3
National Strategy	6
Pre-draft of TAP	19
Draft TAP	63 (+70#)

# a further 70 species are potentially at risk but there was insufficient information to model the impact.

Examination of the species at risk was not confined to formally recognised threatened species (i.e. those listed under the TSC or EPBC Acts), but was broadened to consider all species. For example, 30 of the 63 species at risk were not listed under either Act.

Once a comprehensive list of the species at risk was established, a system was needed to prioritise them for bitou bush control. A series of models was used to examine 63 plant species, two endangered plant populations and nine endangered ecological communities (see the Bitou TAP for further information: DEC 2004). Of these, 11 plants, two populations and four ecological communities were deemed to be at greatest risk from bitou bush invasion (Table 2).

Table 2. Priority biodiversity as identified in the Bitou TAP (Source: reproduced from DEC 2004).

Threatened Entity	Threatened Status
Species	
Acacia terminalis subsp. *terminalis*	endangered (EPBC Act & TSC Act)
Acronychia littoralis	endangered (EPBC Act & TSC Act)
Chamaesyce psammogeton	endangered (TSC Act)
Diuris praecox	vulnerable (EPBC Act & TSC Act)
Fontainea oraria	endangered (EPBC Act & TSC Act)
Gleichenia mendellii	rare (expert opinion)
Pimelea spicata	endangered (EPBC Act & TSC Act)
Plectranthus cremnus	ROTAP (3K)
Senecio spathulatus	endangered (TSC Act)
Sophora tomentosa	endangered (TSC Act)
Zieria prostrata	endangered (EPBC Act & TSC Act)
Populations	
Glycine clandestina (broad leaf form)	endangered (TSC Act)
Zieria smithii (low growing form)	endangered (TSC Act)
Ecological Communities	
Eastern Suburbs Banksia Scrub	endangered (EPBC Act & TSC Act)
Kurnell Dune Forest	endangered (TSC Act)
Littoral Rainforest	SEPP 26[1]
Sutherland Shire Littoral Rainforest	endangered (TSC Act)

Many of the species in Table 2 (and the full list of 63 species in the TAP) do not have recovery plans prepared or in preparation. But as many of them are mainly threatened by bitou bush, their inclusion in the bitou TAP is likely to be highly significant for their conservation.

The locations of the priority species, populations and ecological communities contained in herbarium records, databases and field surveys were assessed using a site model. Only sites that contained bitou bush were considered in the site model. In addition, site selection was not influenced by land tenure in any way. This model assessed the sites based on (i) the entire range of threats present, not just bitou bush, (ii) the ability to achieve effective control while limiting impacts to the threatened species, and (iii) the condition of the threatened species present and the importance of that population to the survival of the species as a whole. As a result of ranking the biodiversity at risk (species model, see above) and the sites for control (site model, see above) a matrix for targeting bitou bush control to areas of high conservation value, irrespective of land tenure in NSW, can be established (i.e. high, medium and low priority species by high, medium and low priority sites, see Table 3). The Bitou TAP aims, in the first instance, to undertake control in the highest priority areas containing the highest priority biodiversity (see Table 3; the entire matrix containing species, populations and ecological communities by sites is presented in the draft TAP: see DEC 2004). This equates to 60 priority sites across coastal NSW. However, by providing the full matrix of threatened biodiversity by site in the Bitou TAP, it is anticipated that broader conservation initiatives and greater bitou bush control can be achieved (ie through regional and local initiatives).

Table 3. Prioritisation of the biodiversity and sites for bitou bush control in the Bitou TAP.

		species		
		high	**medium**	**low**
sites	**high**	TAP priority		
	medium			
	low			

The release of the first weed TAP, albeit a draft, will provide weed managers, stakeholders and the community with an understanding of the process involved. It will also give them an appreciation of how a TAP may deliver conservation benefits as well as weed control and how this approach can be adopted for other weeds. For more information see the draft Bitou TAP (DEC 2004 or visit www.nationalparks.nsw.com.au).

Acknowledgements

Many people helped during the development of the TAP, in particular Jeff Thomas and Andrew Leys. Thanks to Fiona Hall for comments on an earlier version.

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[1] State Enviornment Planning Policy

Place of Plenty: the Arakwal ethnobotanical study

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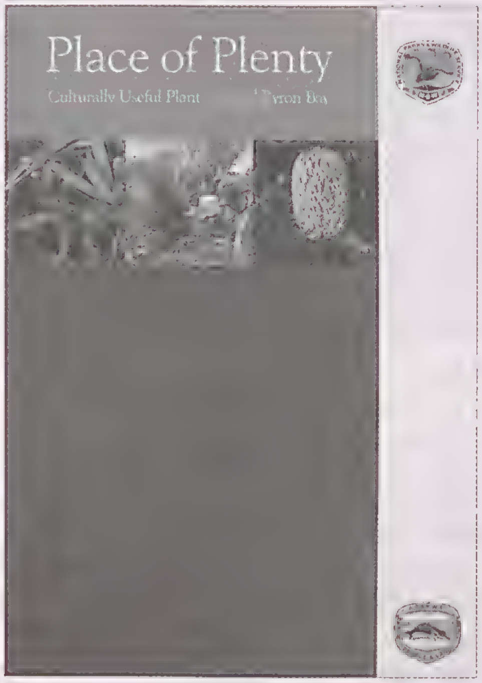
The region around Byron Bay is seen by many as embodying the Australian way of life: sun, sea and sand. The Byron Bay Arakwal people have a deep and intimate attachment with the land-their country-and they acknowledge the diversity of the habitats in the region, and the important wild resources these yield.

Although it remains rich in resources for bush food and medicine, the area around Byron Bay has been devastated by human impacts since the early 1870s. This trend has escalated in recent decades with the increasing resident population and tourist influx. Within their lifetimes the Arakwal Elders have seen the destruction of rainforests, draining of swamps, degradation of streams and introduction of pest plants and animals. These changes have resulted from the pressures of urbanisation and local sandmining. Intensive sandmining in the 1960s has led to the modification of sand dunes and other coastal landforms and, with the widespread planting of inappropriate plants such as the exotic bitou bush, has contributed to the spread of weeds that threaten the native species so valued by the community.

Through the joint management arrangement for the Arakwal National Park, established under an Indigenous Land Use Agreement, between the Byron Bay Arakwal People and the State Government, a collaborative project was undertaken by the NPWS to identify and document the culturally valued plants associated with the reserves in Byron Bay Arakwal Country. The project aimed to benefit park management, cultural renewal and cultural tourism programs, and to promote awareness of the importance of bush foods and medicines in the lives of Aboriginal people. The project resulted in three reports; a resource document for the Byron Bay Arakwal people, a management report providing strategies for park management and a publication, *Place of Plenty: Culturally Useful Plants around Byron Bay*, to increase awareness in the community.

Key components of the project were oral histories from the Arakwal Elders and other community members, and field inspections working closely with an ecologist to map and describe the culturally valued plants. Literature reviews of scientific and historical accounts of the Bundjalung people expanded the information gathered from the oral history to produce a resource document. This will be used by the Byron Bay Arakwal people in their cultural renewal and cultural tourism programs, to educate both their children and grandchildren about their culture and the country.

An important aspect of the project was to inform the joint Management Committee on park management strategies that recognise the importance of culturally valued plants. Fire and pest species control, rehabilitation, visitor access and wild resource use were some of the management issues which benefited from further knowledge of culturally valued plants. Regeneration and restoration programs on land affected by sandmining and weeds are currently involving the Aboriginal community to ensure that the appropriate species are replanted to restore culturally valued plants and biodiversity.



The book, *Place of Plenty*, describes the plants, their habitats and uses based on the knowledge and traditions of Byron Bay Arakwal people. This is interwoven with historical accounts to provide an insight into the past and continuing uses of plants that are an important part of Aboriginal culture. The publication is a valuable resource for the wider community to gain an understanding and appreciation of Aboriginal people's connection to country and the importance of culturally valued plants.

The project has contributed to the Byron Bay Arakwal people playing an ongoing role in decision-making about the park, its biodiversity and cultural landscape. It has helped to facilitate joint management of the park between Byron Bay Arakwal people and NPWS, and has shown how working together to manage the park can successfully achieve dual natural and cultural conservation.

The book *Place of Plenty* is available for $17.50 plus postage ($5.00) from NPWS, PO Box 127, Byron Bay, NSW, 2481.

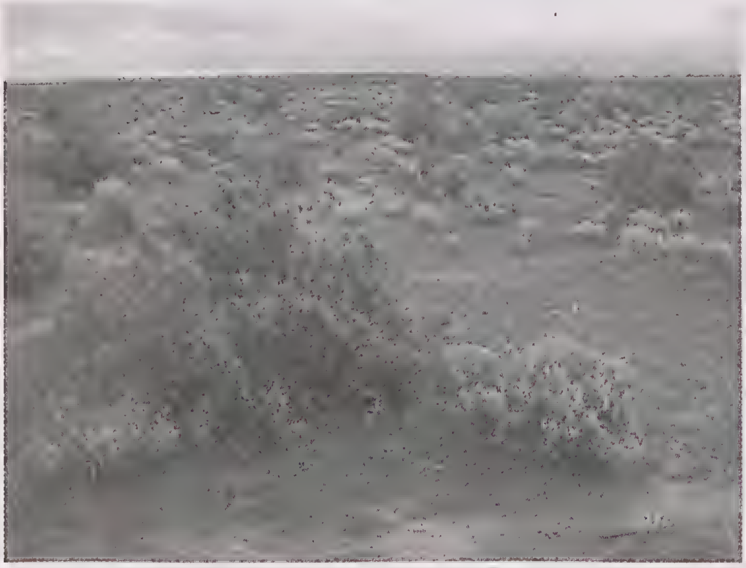
Ned's Corner Treasure Chest

Neil R. Marriott, President, Australian Plants Society, Victoria.

Ned's Corner Station, Victoria's largest private property of almost 30,000 ha, lies on the Murray River, 80 km to the west of Mildura. Originally owned by Edward (Ned) Baggart, it then became part of the famed Kidman empire right up until the mid-1980s. In 2002 the property was purchased at auction by the Trust for Nature. This organisation is a non-profit body that actively pursues biodiversity conservation on private property via a number of means, notably voluntary conservation covenants and land purchase.

The Trust for Nature launched a public appeal to help pay for Ned's Corner. Generous support was given by federal, state and local government, as well as by the public, including the local community. After much discussion the Australian Plants Society (APS) donated $25,000 to the Trust for "property purchase".

Old growth Black Box/Redgum Woodland, found to support the rare Asperula gemella *(Twin-leaf Bedstraw). Photo: Neil Marriot*



The Chenopod plains at Ned's Corner. Photo: Neil Marriot

With over 34 km of Murray River frontage, extensive lignum wetlands, vast chenopod plains, Cypress-pine/Belah sand dunes, mallee woodland and the largest areas of Black Box Woodland in Victoria (most of these are endangered or threatened vegetation communities), there is much to see and do on this amazing property. Last year I was contracted to carry out flora surveys of all communities on Ned's Corner, and the results were staggering: nearly all the Ecological Vegetation Classes are threatened and already we have recorded over 45 significant taxa. These include at least three new species for the state and a possible entirely new species for science! Multi-headed sneezeweed (*Centipeda pleiocephala*), collected in 1853 by von Mueller, was presumed extinct for the state until its relocation at Ned's. Likewise bowl-fruit sneezeweed (*Centipeda crateriformis* ssp *crateriformis*) has never previously been recorded for Victoria, and the same applies to the true pop saltbush (*Atriplex spongiosa*).

In late August 2004 the Wimmera group of APS held a weekend campout at Ned's Corner, with around 25 members attending. I was invited to lead the group. Despite the ongoing drought, there was clear evidence of recovery after many years of overgrazing and lack of vermin control. The Trust for Nature has de-stocked the property and is working with the Mallee Catchment Management Authority to eradicate rabbits and pigs on the station. Many millions of beautiful young saltbushes and other plants are germinating and recolonising the once ravaged land. We were excited to find, for example, that the pop saltbush is now appearing extensively over the station in the tens of thousands! The same is true for *Crinum flaccidum, Calostemma purpureum, Eremophila sturtii* and many of the other rare, endangered and threatened species that occur on the property.

The APS group had a wonderful weekend on Ned's Corner, finding many rare and unusual native plants. In a future newsletter I will write a full article about the amazing discoveries at Ned's Corner Station, where the outback comes to Victoria!

If any readers wish to support the Trust for Nature or learn more about Ned's and their other properties and activities, email johna@tfn.org.au, or visit the Trust's website www.tfn.org.au.

New Community Project to Conserve *Pimelea spicata* in Western Sydney

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Thanks to a committed local residents' group at Narellan, the future is looking better for a threatened plant and irreplaceable patch of bush in south-western Sydney. Parrotts Farm, managed by Camden Golf Club, is home to a significant population of the endangered *Pimelea spicata* (Pink Pimelea or Rice Flower), as well as a remnant of the endangered ecological community Cumberland Plain Woodland.

The small shrub *Pimelea spicata* is only known from approximately 26 sites across western Sydney and the Illawarra, and Parrotts Farm houses one of the largest known populations, being one of only four populations estimated to support greater than 500 individuals. The significance of this site is recognised through an existing federal conservation agreement on the site. Like the majority of *P. spicata* populations, the Parrotts Farm population is threatened by weed invasion, particularly Bridal Creeper (*Asparagus asparagoides*), Kikuyu (*Pennisetum clandestinum*), African Olive (*Olea africana* ssp *africana*), Privet (*Ligustrum lucidum*), and *Freesia* sp. The area is also threatened by rubbish dumping and trail bike activity. On National Threatened Species Day, September 7th, the Wilson Richardson Area Residents' Group (WRARG) was awarded funds from the Threatened Species Network Community Grants to carry out the project. A revised Plan of Management will be developed for the site, and works to be undertaken will include flora and targeted fauna surveys, weed control, removal of dumped rubbish, fencing, access control and the establishment of monitoring points and experimental plots.

The weed control is going to be particularly challenging given that very little is known about how to control the non-woody weeds such as Kikuyu and Freesias without impacting upon *P. spicata*. Consequently, much of the weed control will be undertaken in an experimental manner allowing investigation of various control measures.

Involvement and education of the broader community is also a key part of the project, and the WRARG group will conduct community open days, support local education initiatives, and encourage ongoing regional media on the project and the value of the area's urban bushland.

Individuals interested in finding out more or wishing to take part in the project are encouraged to contact WRARG president, Pam Browne, on (02) 4646 1110 or at WRARG@hotmail.com, or the NSW & ACT Coordinator of the Threatened Species Network, Alison Colyer, on (02) 9281 5515 or at acolyer@wwf.org.au.

Pimelea spicata *in flower growing amongst grasses. The small habit of* P. spicata *makes weed control particularly challenging. Photo: Martin Bremner*

The Department of Environment and Conservation (NSW) has prepared a draft recovery plan for the endangered plant *Pimelea spicata.* The draft plan is on public exhibition until 15 November 2004 and is available from the DEC Web Site (www.nationalparks.nsw.gov.au) during the period of exhibition.

Plant Conservation News from Indonesia

Prepared by Frank Zich
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New Botanical Gardens for Indonesia

On 11 August 2004 the then Indonesian President, Megawati Soekarnoputri, launched a major nationwide program to build a botanical garden in each of the 32 provinces. The main objective of the botanical gardens will be to conserve local rare plants. Megawati said the botanical gardens would help the country protect its natural resources.

"By developing these botanical gardens, we will be safeguarding the country's biodiversity. Every governor should pay attention to the effort to conserve natural resources," the President said in her speech, which was given to mark National Technology Day.

Currently, Indonesia has five botanical gardens in 4 provinces – Bogor and Cibodas Botanical Gardens in West Java, Purwodadi Botanical Garden in East Java, Eka Karya Botanical Gardens in Bali, and Bukit Sari Botanical Gardens in Jambi (Sumatra).

There is no time frame for the establishment of the botanical gardens and each provincial government will provide funding for the gardens. The central government is offering to provide an oversight role and Bogor Botanical Gardens will provide seeds and plants if necessary.

A Network of South East Asia Botanic Gardens

In July, Bogor Botanical Gardens in Indonesia hosted the first meeting of the South East Asian Botanic Gardens (SEABG) network. SEABG was formed in January 2004, and aims to provide networking, recognition and support for botanic gardens in South East Asia to ensure that they achieve their potential as one of the guardians of plant diversity and environmental heritage of South East Asia.

The first meeting was a training course in data management funded by Investing in Nature – South East Asia, a grant awarded by HSBC Bank (London) to Botanic Gardens Conservation International (BGCI). Course participants were staff of botanic gardens who are members of the SEABG network. Countries represented at the first meeting were Cambodia, China, Indonesia, Lao, Malaysia, Philippines, Singapore, Thailand and Vietnam. Presenters were from USA, Netherlands, Australia, Singapore and Indonesia.

Research Roundup

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Publications and Information Resources

Ex Situ Plant Conservation: Supporting Species Survival in the Wild

Guerrant, Havens and Maunder, 2004

Ex Situ Plant Conservation
Supporting Species Survival in the Wild

Ex Situ Plant Conservation is the first book to address integrated plant conservation strategies and to examine the scientific, technical, and strategic bases of the ex situ approach. The book examines where and how ex situ investment can best support in situ conservation. It outlines the role, value, and limits of ex situ conservation as well as updating best management practices for the field.

$80. To order email: Orders@islandpress.org or order online at www.islandpress.org

Tasmania's Natural Flora

Whiting et al. 2004.

Descriptions of over 700 plant species that occur within Tasmania. The book has been prepared by a group of concerned tasmanians whose primary objective is to present a snap shot of the natural flora of Tasmania. The book is based on a 2002 publication: 'A census of the vascular plants of Tasmania, Tasmanaian Herbarium Occasional Publication No. 7.' Descriptions are written in terms that can be understood by the casual observer and are complemented by clear colour photographs or line drawings.

$70.00 (+$10 p&h). To order phone: 03 64259229 or email yahgunyah@southcom.com.au

Declared Plants of Australia: an identification and information system

The Centre for Biological Information Technology. 2004.

Declared Plants of Australia
Declared Plants of Australia
An Identification and Information System

The Centre for Biological Information Technology (CBIT) has released a new interactive tool for identifying declared plants (noxious weeds) in Australia. Declared Plants of Australia uses the Lucid™ identification system also developed by the Centre, and allows you to easily select features of the plant you wish to use when trying to identify a weed. The key provides images, text and a number of functions that will help you in the identification process. The CD provides extensive information about over 300 declared plants and includes over 600 other species of commonly occurring weeds.

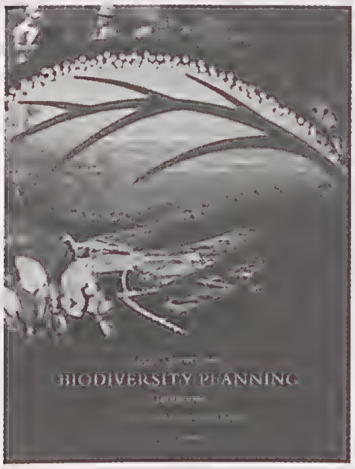
$80.00 (+$9 p&h within Aust). For additional information and to order visit, http://www.cbit.uq.edu.au/software/declaredplants/default.htm

For information on Lucid™ the software tool used to create these information and identification tools, visit http://www.lucidcentral.org

Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region

Western Australian Local Government Association. 2004.

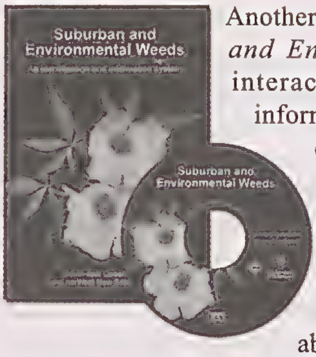
To assist Local Government to strategically plan for the retention, protection and management of Perth's biodiversity, the Perth Biodiversity Project (PBP) has prepared the 'Local Government Biodiversity Planning Guidelines for the Perth Metropolitan Region'. The Guidelines provide Local Government with an understanding of the values of biodiversity in the Perth Metropolitan Region and a methodology for preparing and implementing Local Biodiversity Strategies. The Guidelines contain important policies, tools and templates for Local Governments to prepare Local Biodiversity Strategies. Local Governments have an important role to play in the conservation of biodiversity through their involvement in the land use planning process and the direct management of many natural areas. To ensure biodiversity values are considered in the land use planning process, the Guidelines promote comprehensive ecological assessments of natural areas prior to decisions on developments being made. Councils are encouraged to also offer incentives to private landowners who commit to protecting natural areas in the long term as well as strategically manage biodiversity in local reserves.



Download or order at http://www.walga.asn.au/projServices/pbp/index.htm.

Suburban and Environmental Weeds: an identification and information system

The Centre for Biological Information Technology. 2004.


Suburban and Environmental Weeds
Suburban and Environmental Weeds

Another tool from CBIT, *Suburban and Environmental Weeds* is an interactive identification and information system on CD-ROM developed for those who wish to identify weeds commonly found in the suburban areas of South-east Queensland and North-east New South Wales. It includes an abundance of information that can be accessed in a variety of ways and should be of interest to advisors, researchers, students, weed control officers and anyone interested in learning more about weeds.

For further information on *Suburban and Environmental Weeds*, please visit http://www.cbit.uq.edu.au/software/suburbanweeds/default.htm

Trees for Saline Landscapes

N. Marcar and D. Crawford, 2004

This book presents current knowledge on a large suite of tree species tolerant to different levels of salinity as well as their uses. Contains detailed descriptions of 85 saline tolerant species as well as a detailed overview of salinity problems in Australia. Assists all involved in Australian agriculture to make decisions about which trees might be appropriate for different types of salt-affected environments as well as an introduction to the physical and chemical nature of the soil environment, issues on sustainability and the establishment and management of tree plantings.

$36. Rural Industries Research and development Corporation (Publication No 03/108). Order online by visiting http://extranet.rirdc.gov.au/eshop/. Chapter one is available for free online at http://www.rirdc.gov.au/reports/AFT/03-108sum.html.

Freebies

Introductory Weed Management Manual

Department of the Environment and Heritage and CRC for Australian Weed Management, 2004

This manual has been prepared as a training aid for the use of private landholders, conservation groups, catchment management groups, local, state and teritorry governments and industry. It is an introductory guide for those with little experience with weed management, particularly environmental weeds. It will be of use to those who wish to develop their weed management skills, and as an extension resource for those who need to develop the weed management capacity of others. The manual is presented in four modules: Developing and implementing a weed management plan; weed control methods for community groups; collecting and preparing plant specimens for identification; presentation of information sessions for small groups.

Report can be downloaded at http://www.weeds.crc.org.au/documents/manual.pdf

Garden Plants that are Invasive Plants of National Importance: an overview of their legal status, commercial availability, and risk status

Glanznig, McLachlan and Kessal, 2004

Produced by the World Wildlife Fund, this report presents firm evidence of how poorly coordinated legislative controls have enabled a significant number of garden plants that are invasive plants to be commercially traded through the gardening industry and thus widely distributed. Read the report at http://www.wwf.org.au/News_and_information/Publications/PDF/Report/IPNIGardenPlants.pdf.

View the report's list of 1036 naturalised invasive and potentially invasive garden plants at http://www.wwf.org.au/News_and_information/Publications/PDF/Conservation_guide/ListInvasivePlants.pdf.

Natural Resource Management on Australian Farms

Nelson et al. 2004

This report presents results from a 2001-02 survey on resource management on Australian farms, which was funded by the National Landcare Program. The survey was designed to investigate awareness and management of land degradation by Australian broadacre and dairy farmers, as well as influences on the management of land degradation, including participation in Australian Government natural resource management programs. The results of the survey provide insights directly from farmers into land degradation and the adoption of sustainable farming practices.

The publication can be downloaded at http://abareonlineshop.com/product.asp?prodid=12675.

ANPC Workshops

Approaches and techniques for the rehabilitation of native vegetation in SEQ

28-30 November 2004, University of Queensland,
Gatton Campus, Gatton, Qld
and
1-2 & 4 December 2004, Mt Coot-tha Botanic Gardens,
Brisbane, Qld

The ANPC and the Queensland Herbarium (EPA) will be running two workshops in South-East Queensland on approaches and techniques for the rehabilitation of native vegetation remnants. The workshops have been tailored to meet the regional needs and priorities of practitioners working in SEQ. A key goal of the workshops is the increased transfer and uptake of knowledge and skills gained from scientific investigation and practical experience.

Both workshops will be partial replicates, but may include different case studies, issues and presenters. Most sessions will be delivered by researchers and practitioners from SEQ.

There will be a strong focus on techniques for assessing the vegetation remnant (quality, threats, values) and the task ahead (the rehabilitation goal, issues such as provenance, conservation genetics, threatened species requirements, and the resources and constraints); planning the rehabilitation process, and incorporating monitoring from the beginning to enable ongoing assessment and adaptive management.

Several interactive tools will be demonstrated, such as the Queensland Herbarium's mapping methodology and interactive identification tools for weeds, grasses, wattles and eucalypts, based on the Centre for Biological Information Technology's Lucid ™ software tool.

Participants will visit rehabilitation sites that provide lessons from both successful and less successful rehabilitation projects.

Workshop on the Translocation of Threatened Plants

23 November 2004, CALM Training Centre, Hayman Rd,
Kensington, Perth, WA
and
3 December 2004, Mt Coot-tha Botanic Gardens, Brisbane, Qld

Aimed at anyone involved in the planning, approval or implementation of translocation projects for threatened flora. Presented by the authors of the recently revised Guidelines for the Translocation of Threatened Plants in Australia, with specific components provided by local experts, covering issues of the region with local case studies.

For more information on any of these workshops, visit the ANPC website at http:www.anbg.gov.au/anpc (and click on 'TRAINING') or contact Sally Stephens at the ANPC National Office, ph: 02-6250 9523, email: ANPC-Sally.Stephens@deh.gov.au

Funding and support for the Queensland workshops has been provided by:

Natural Heritage Trust
Helping Communities Helping Australia
An Australian Government Initiative

Australian Government envirofund

Queensland Government
Environmental Protection Agency

The University of Queensland
Australia

Support for the Western Australian Translocation Workshop has been provided by:

Kings Park & Botanic Garden
Botanic Gardens & Parks Authority

Government of Western Australia

Department of Conservation and Land Management
Conserving the nature of WA

Conferences and Workshops

Furthering the Fight - Sydney Weeds Conference

23 October 2004, Parramatta Town Hall, NSW

This one-day free Conference is an educational event for volunteer bush regenerators, staff, contractors and community members who are interested in caring for natural areas. Find out about what's happening in the Sydney Region, including new weeds emerging; success stories for managing terrestrial and aquatic weeds; and community, local councils, state and federal government agencies working together to fight the weed invasion. For further information visit www.sydneyweedscommittees.org.au

Turning the Tide: 2004 NSW Environmental Educators Conference

29 - 30 October 2004 at Mt Penang Parklands, Kariong, NSW

This conference will be a predominantly hands-on event. Presenters will provide ideas for improvement and innovation in the delivery of environmental education in both schools and the community (including business and industry). For further information visit http://www.rumbalara-e.schools.nsw.edu.au

Sydney's Hands-on Environmental Forum: Inspirations, Motivations and Celebrations

5 & 6 November 2004, Sydney University, NSW

Will celebrate on-ground environmental achievement and community action in Sydney through case studies, presentations by experts and interactive workshops. It will inspire and motivate volunteers and the wider community by highlighting successful volunteer bushcare, urban biodiversity, stormwater, advocacy and community engagement projects and activities. The forum is an initiative of the Sydney Metropolitan Catchment Management Authority Local Establishment Team. For further information contact Community Support Officer, Leanne Cusiter on 02 9895 5965 or email leanne.cusiter@dipnr.nsw.gov.au

Ecopolitics XV International Conference

12-14 November 2004, Macquarie University, Sydney

The Ecopolitics Conference series promotes networking and discussion of environmental politics and policy among researchers and educators, government sector representatives (at all levels), business and industry representatives, elected politicians, NGOs and the general public. The theme of this Conference is Environmental Governance: Transforming Regions and Localities. Environmental governance refers to the written and unwritten policies, decision-making and behaviour that affect the way the environment is managed; particularly with regard to openness, participation, accountability and effectiveness. For further information visit: http://www.gse.mq.edu.au/ecopolitics or contact Kristen Hebert, ph: 9850 6970, email: ecopolxv@els.mq.edu.au.

International Conference on Water Sensitive Urban Design: Cities As Catchments

21 - 25 November 2004, Adelaide, South Australia

Cities as Catchments will explore changes being made in urban water planning and management that are compatible with greater sustainability. For further information visit http://www.plevin.com.au/WSUD2004/

Second Riverina Biodiversity Forum: Biodiversity in modified landscapes: the challenges of reconciling biodiversity with irrigated agriculture

9-11 February 2005, Griffith, NSW

The forum aims to explore the challenges scientists, managers and landholders face in enhancing biodiversity within our current agricultural landscapes and will involve interaction with local land managers and field trips to nearby farms. The event will start with a field trip on the 9th, followed by the two day Forum. It is anticipated that around 200 people, including farmers, scientists, resource managers and facilitators will attend. For further information please contact Janelle McGufficke of Ricegrowers' Association of Australia, ph: (02) 6953 0598, email: jmcgufficke@rga.org.au.

18th World Orchid Conference

11-20 March 2005, Dijon, France

Provisional program and information available at: http://www.woc2005.org/

Beyond Declarations - Working Partnerships for Sustainability National Conference

16 - 18 March 2005, Manly Pacific Hotel, Manly, NSW

The conference is designed for all who are interested in developing effective sustainability partnerships including sustainability practitioners from all levels of government (including environmental scientists, environmental educators, social and strategic planners, engineers and councillors) and the corporate, academic and community sectors. For further information visit the Events page of http://www.batonforum.org.au/ or contact Julie McGraw, Conference Organiser, GEMS Pty Limited, phone 02 9744 5252, email: jmcgraw@gemspl.com.au

XVIII International Botanical Congress

17-23 July 2005, Vienna, Austria

Preliminary program and information available at: http://www.ibc2005.ac.at/

First International Conference on Engaging Communities

14 - 17 August 2005, Brisbane Convention & Exhibition Centre, Queensland, Australia

An Initiative of the United Nations and Queensland Government. This unique event will explore all issues related to community engagement and address the experiences, challenges and research which effect all citizens, governments and organisations alike. The program is designed to interest representatives from community groups, academia, government agencies, corporations, associations and the like. For further infirmation mail: info@engagingcommunities2005.org or visit: http://www.engagingcommunities2005.org

Eighth International Mycological Congress

20 - 26 August 2006, Cairns, Queensland

Will be the first International Mycological Congress held in the Southern Hemisphere. You can register your interest online at http://www.sapmea.asn.au/conventions/imc8/index.html

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Are you interested in when plants flower and fruit?

Would you like to contribute specific observations over several years to a growing body of information?

BIOWATCH is a new interactive website (http://www.bio.mq.edu.au/ecology/biowatch/Biowatch.htm) designed to build up records of annual plant (and animal) events over time and space, particularly in view of possible future differences due to climate change. These records are also interesting in relation to variation within single species. It is voluntary and cooperative. At the simplest, you might undertake to record first flowering for a particular species at a particular location, each year.

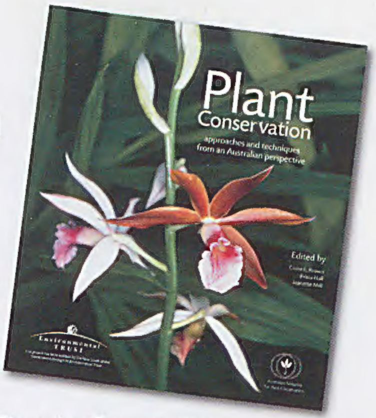
For further information have a look at the website, or contact Dr Barbara Rice at Macquarie University, email: brice@bio.mq.edu.au

Biowatch

Royal Botanic Gardens Victoria
RBG00013043

Plant Conservation:

Approaches and Techniques from an Australian Perspective



Plant Conservation approaches and techniques from an Australian perspective

This manual is based on the series of training courses run by the ANPC, and covers a comprehensive range of topics to be considered when undertaking conservation and rehabilitation activities.

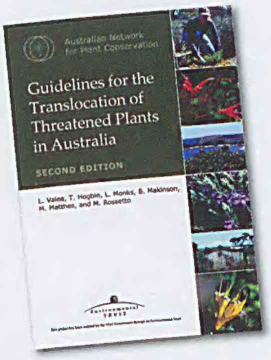
In his foreword, Carl Binning writes: *"It will become one of the most well used tools in the kit of practitioners everywhere, whether they work in the paddock or the office. The manual draws on the expertise of some of the leading exponents of practical conservation in Australia. The techniques and methods have been tested and refined by a broad network of plant conservation practitioners."*

35 authors contributed to the manual, which includes 39 chapters contained in 11 modules.

The modules in the manual are:

- Principles and Ethics of Conservation
- Conservation Instruments and Initiatives
- Getting Started: Information for Conservation
- Conservation in the Field
- Rehabilitation and Translocation
- Monitoring and Adaptive Management
- Ecological Communities
- Propagating Threatened Flora for Conservation
- Cryptogams
- Training
- References and Resources

Only $55 + postage and handling



Australian Network for Plant Conservation

Guidelines for the Translocation of Threatened Plants in Australia

SECOND EDITION

L. Vallee, T. Hogbin, L. Monks, B. Makinson, M. Matthes, and M. Rossetto

Guidelines for the Translocation of Threatened Plants (Second edition)

Only $22 + postage & handling

See inside for Order form, or download form from *http://www.anbg.gov.au/anpc/books.html*

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Government of Western Australia Department of Conservation and Land Management *Conserving the nature of WA*

Kings Park & Botanic Garden Botanic Gardens & Parks Authority

Queensland Government Environmental Protection Agency

The University of Queensland

Australian Network for Plant Conservation
presents a workshop on

APPROACHES AND TECHNIQUES FOR THE REHABILITATION OF NATIVE VEGETATION IN SOUTH EAST QUEENSLAND

Are you involved in the conservation and rehabilitation of South East Queensland's native vegetation? Then this workshop is relevant to you!

The workshop has been specifically tailored for the region, incorporating local case studies and drawing on practical experience and scientific investigation.

There will be a strong focus on:

- Assessing the vegetation remnant (condition, ecosystem function, threats, biodiversity values);
- Assessing the task ahead (consultation, responsibilities, the rehabilitation goal, issues such as provenance, conservation genetics, threatened species requirements, resources and constraints, social values);
- Planning the rehabilitation process (the rehabilitation goal, experimental approaches, timelines & responsibilities, risk management, monitoring),
- Monitoring, evaluation and adaptive management – into the future.

THE WORKSHOP WILL BE RUN TWICE AT SEPARATE LOCATIONS

Workshop 1:

University of Queensland, Gatton Campus,
Warrego Highway, Queensland

Field trip Sun 28 November
Workshop Mon 29 - Tues 30 November

Workshop 2:

Brisbane Botanic Gardens Auditorium,
Mt Coot-tha, Toowong, Queensland.

Workshop Wed 1 – Thurs 2 December
Field trip Sat 4 December

Workshops 1 and 2 will be replicates, but may include some different case studies and presenters. Researchers and practitioners working in SEQ will deliver most sessions.

Places are limited.
Registrations close 19 November 2004.

Workshop Fees (GST included).
Fees include catering, field trip and a free Plant Conservation Techniques Manual (rrp $55)

ANPC member: $275; Concession: $110
Non-member: $295; Concession: $130

Photos (top to bottom): Remnant softwood scrub, Rosewood, Photo: Grant Wardell-Johnson, Uni of Qld, Gatton; Endangered *Boronia granitica*, Photo: Paul Donatiu (WWF); The Petrie Creek Catchment Care Group and delegates from a Unilever conference help revegetate the creek headwaters, Photo: Cerran Fawns, PCCCG; *Acacia harpophylla* in brigalow softwood scrub, Photo: Kristen Dodd (GA); Brigalow softwood scrub canopy, Photo: Sandra Williams (GA).

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THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

Australasian Plant Conservation
BULLETIN OF THE AUSTRALIAN NETWORK FOR PLANT CONSERVATION

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